AMMP CENTRE

BULLETIN

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Conducting World Class Research

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DISCUSSIONS - AMMP was also represented by Dr Farazila Yusof and Dr Tuan Zaharinie for the recent talks.

AMMP in talks with SWEP for possibility of Student Industrial Training

4 February 2015 - Emeritus Professor Dr. Tadashi Ariga from Tokai University, Japan led AMMP team for a visit to SWEP Malaysia Sdn. Bhd. Professor Ariga, a visiting professor hosted by the AMMP is a leading expert in the field of brazing and soldering was in the meeting with SWEP Malaysia for technical consultation on industrial application for brazing.

SWEP, known as one of the world's leading suppliers of brazed plate heat exchangers is a great company for students to work as interns especially for those undertaking research in the field. In the meeting, AMMP proposed that the network is strengthened with sending students for their industrial training.

Professor Ariga also delivered a lecture on Aerospace Engineering on 6th of February as part of his one week visit in February 2015. The lecture covered topics such as advanced designs and materials for aerospace applications, specific joining methods and technologies for high temperature applications and jet engine design.

News in Pictures

HIGH PROFILE- Prof. Ray Han, an expert in cancer research from Peking University, China was also hosted by AMMP in February

ATTENTIVE - Junior lecturers were listening to Professor Ir. Dr. Ramesh Singh's talk on 'The Bloom's Taxonomy'.

Upcoming Events

PROFESSOR DR. MOHD HAMDI is a Professor at the Faculty of Engineering. He was a former Deputy Vice Chancellor for Academic and International in University of Malaya. With more than 20 years experience, he has strategized transformation in the academics and has significantly pushed the university to greater heights. Prof Hamdi has had great successes in commercialization of research activities.

For more information and registration please visit:

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Research Highlights

Optimization of Economic Lot Scheduling Problem with Backordering and Shelf Life Consideration using Calibrated Metaheuristic Algorithms

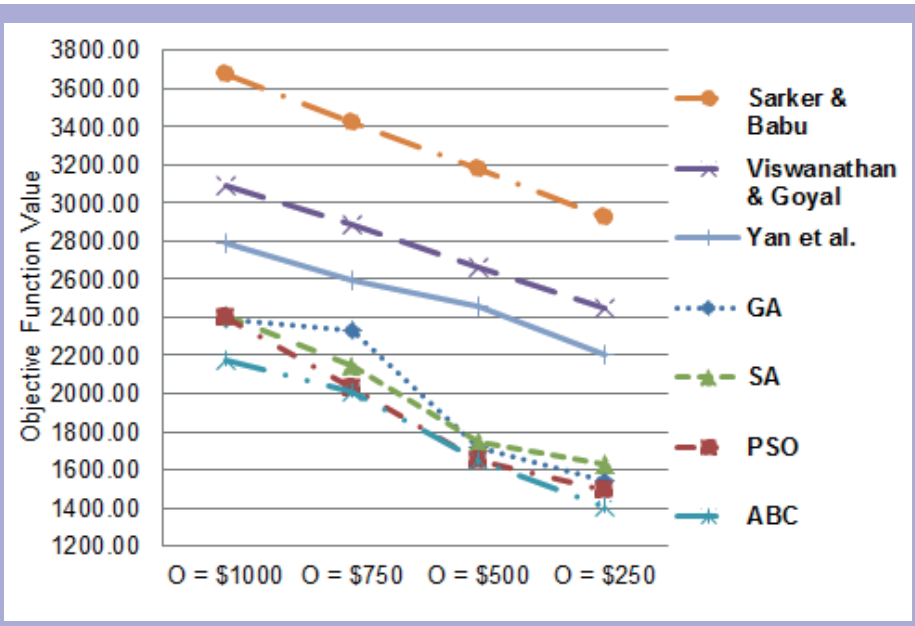
By Maryam Mohammadi

Recently, shelf life during which items remain safe within production plants is being increasingly considered in production optimization models. This project addresses a manufacturing system, whereby multiple items produced in a single facility have shelf life restrictions and planned backorders. For some products, shelf life might be less than the production cycle time, which leads to item spoilage before the end of the cycle. In such cases, in order to achieve a feasible schedule, the production cycle time needs to be reduced to less than or equal to the shelf life duration. On the other hand, backorders incur shelf life constraint alteration, which affects the corresponding inventory models.

Accordingly, appropriate modifications are applied to the related mathematical inventory models. The purpose is to determine the optimal cycle time in addition to minimizing the long-run average costs including production, setup, holding, and shortage costs. While the cost-minimization cycle time causes the spoilage of products due to shelf life restrictions, proper decisions are made based on one of three options: production rate reduction, cycle time reduction, or the simultaneous production rate and cycle time reduction. For each scenario the optimal cycle time and production rate are estimated, which satisfy the shelf life constraints.

Eventually, numerical examples are presented to illustrate the influence of production cost, backorders, and shelf life on total cost. Subsequently, the economic lot scheduling problem (ELSP) with multiple items produced on a single facility in a cyclical pattern and shelf life restrictions is addressed. A mixed integer non-linear programming model is developed which allows each product to be produced more than once per cycle and backordered.

However, production of each item more than one time may result in an infeasible schedule due to the overlapping production times of various items. To eliminate the production time conflicts and to achieve a feasible schedule, the production start time of some or all the items must be adjusted by either advancing or delaying. The objective is to find the optimal production rate, production frequency, cycle time, as well as a feasible manufacturing schedule for the family of items, in addition to minimizing the long-run average cost.



GRAPHICAL REPRESENTATION of the performance comparison between applied metaheuristic algorithms and previous methods in terms of objective function values

Metaheuristic methods namely genetic algorithm (GA), simulated annealing (SA), particle swarm optimization (PSO), and artificial bee colony (ABC) algorithms are adopted for the optimization procedures. Furthermore, to make the algorithms more effective, Taguchi method is employed to tune various parameters of the proposed algorithms. The computational performance and statistical optimization results show the effectiveness and superiority of the metaheuristic algorithms over other reported methods in the literature.

Maryam is a PhD student under the supervision of Dr Ardeshir Bahreininejad and Dr Nurmaya Musa. Her fields of interests are production planning and control, supply chain management, operations research and optimization using metaheuristic algorithms.

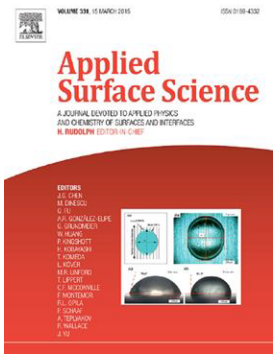
Recent Publications

Development of Optimum Process Parameters and a Study of the Effects of Surface Roughness on Brazing of Copper

Tuan Zaharinie, Zainul Huda, Mohd Faaliq Izuan, Mohammed Hamdi. 2015. Development of optimum process parameters and a study of the effects of surface roughness on brazing of copper. Applied Surface Science 331:127-131. (Available online at : http://www.sciencedirect.com/science/article/pii/S0169433215001026)

Keywords: Brazing process design; Brazing filler metal; Wettability; Surface roughness; Material characterization;Braze-joint strength

Applied Surface Science is ranked Q1 in Materials Science, Coatings & Films category, and Q1 in Applied Physics category.



The AMMP Centre was established in 2002 with the aim of strengthening research activities in advanced manufacturing and material processes. The team has evolved from a small discussion platform of like-minded researchers to a fully operational research and consultation group in University of Malaya. Throughout the years, AMMP Centre has secured substantial research funding and commercialization grants from both local and international sources. For more information visit www.ammpcentre.com